

CLAIMS

What Is Claimed Is:

1. A blow molded, biaxially oriented plastic container adapted for top load force enhancement and vacuum absorption, the container having an upper portion including a mouth defining an opening into the container, a lower portion forming a base, and a sidewall portion connected with and extending between said upper portion and said lower portion; said upper portion, said lower portion and said sidewall portion cooperating to define a receptacle chamber within the container into which product can be filled; said upper portion including a modulating waist region; and said sidewall portion including a plurality of generally rectangular shaped vacuum panels and a plurality of columns formed therein, said modulating waist region being movable to accommodate top load forces and said vacuum panels being movable to accommodate internal changes in pressure and volume in the container resulting from heating and cooling of its contents.

2. The container according to Claim 1 wherein said modulating waist region comprises a tri-global modulating annular groove.

3. The container according to Claim 1 wherein said modulating waist region comprises an annular groove extending circumferentially around the container having first radius portions and second radius portions.

4. The container according to Claim 3 wherein said first radius portions are less than said second radius portions in dimension.

5. The container according to Claim 4 wherein said first radius portions are aligned vertically with said columns and said second radius portions are aligned vertically with said vacuum panels.

6. The container according to Claim 1 wherein said sidewall portion further includes a first annular groove extending circumferentially around the container adjacent to said modulating waist region and a second annular groove extending circumferentially around the container adjacent to said base.

7. The container according to Claim 6 wherein said first annular groove and said second annular groove include upper and lower plateaued portions, said upper plateaued portions being aligned vertically with said vacuum panels and said lower plateaued portions being aligned vertically with said columns.

8. The container according to Claim 1 wherein said columns form a first generally convex shaped surface in cross section when the container is formed and a second generally convex shaped surface in cross section when the container is filled, sealed and cooled.

9. The container according to Claim 8 wherein said plurality of columns include a plurality of horizontal indents formed therein.

10. A blow molded plastic container adapted for top load force enhancement and vacuum absorption, the container having an upper portion including a mouth defining an opening into the container, a lower portion forming a base, and a sidewall portion connected with and extending between said upper portion and said lower portion; said upper portion, said lower portion and said sidewall portion cooperating to define a receptacle chamber within the container into which product can be filled; said upper portion including a tri-global modulating waist region; and said sidewall portion including a plurality of generally rectangular shaped vacuum panels and a plurality of columns formed therein, said columns forming a first generally convex shaped surface in cross section, said tri-global modulating waist region being movable to accommodate top load forces and said vacuum panels being movable to accommodate vacuum forces generated within the container thereby decreasing the volume of the container.

11. The container according to Claim 10 wherein said columns form a second generally convex shaped surface in cross section when the container is filled, sealed and cooled.

12. The container according to Claim 10 wherein said plurality of generally rectangular shaped vacuum panels comprise three vacuum panels and said plurality of columns comprise three columns, said vacuum panels and said columns being equidistantly spaced around the container.

13. The container according to Claim 10 wherein said tri-global modulating waist region comprises an annular groove extending circumferentially around the container having first radius portions and second radius portions, wherein said first radius portions are less than said second radius portions in dimension.

14. The container according to Claim 13 wherein said first radius portions are aligned vertically with said columns and said second radius portions are aligned vertically with said vacuum panels.

15. The container according to Claim 10 wherein said sidewall portion further includes a first annular groove extending circumferentially around the container adjacent to said tri-global modulating waist region and a second annular groove extending circumferentially around the container adjacent to said base.

16. The container according to Claim 15 wherein said first annular groove and said second annular groove include upper and lower plateaued portions, said upper plateaued portions being aligned vertically with said vacuum panels and said lower plateaued portions being aligned vertically with said columns.

17. A blow molded plastic container comprising:

an upper portion defining a mouth;

a shoulder portion formed with said upper portion and extending downward therefrom;

a modulating waist region formed with said shoulder portion and extending downward therefrom;

a lower portion forming a base of the container; and

a sidewall extending between and joining said modulating waist region with said lower portion, said sidewall including a plurality of generally rectangular shaped vacuum panels and a plurality of columns formed therein, said modulating waist region being movable along a vertical axis in response to top load forces, and said vacuum panels being inwardly movable along a radial axis, said movement being in response to internal changes in pressure and volume in the container resulting from heating and cooling of its contents.

18. The container according to Claim 17 wherein said columns form a first generally convex shaped surface in cross section when the container is formed and a second generally convex shaped surface in cross section when the container is filled, sealed and cooled.

19. The container according to Claim 18 wherein said plurality of columns include a plurality of horizontal indents formed therein.

20. The container according to Claim 17 wherein said plurality of generally rectangular shaped vacuum panels comprise three vacuum panels and said plurality of columns comprise three columns, said vacuum panels and said columns being equidistantly spaced around the container.

21. The container according to Claim 17 wherein said modulating waist region comprises an annular groove extending circumferentially around the container having first radius portions and second radius portions, wherein said first radius portions are less than said second radius portions in dimension.

22. The container according to Claim 21 wherein said first radius portions are aligned vertically with said columns and said second radius portions are aligned vertically with said vacuum panels.

23. The container according to Claim 17 wherein said sidewall portion further includes a first annular groove extending circumferentially around the container adjacent to said modulating waist region and a second annular groove extending circumferentially around the container adjacent to said base.

24. The container according to Claim 23 wherein said first annular groove and said second annular groove include upper and lower plateaued portions, said upper plateaued portions being aligned vertically with said vacuum panels and said lower plateaued portions being aligned vertically with said columns.